Title: Oktoberfest

Link to Outcomes:

- **Problem Solving** Students will demonstrate the ability to solve mathematical problems including ones with open-ended answers and those which solved in a cooperative atmosphere.

- **Communication** Students will demonstrate the ability to communicate mathematically. They will read, write, and discuss mathematics using the signs, symbols, and terms of the discipline.

- **Reasoning** Students will demonstrate their ability to reason mathematically. They will make conjectures, gather evidence, and build arguments.

- **Connections** Students will demonstrate their ability to connect mathematics to real-life situations..

- **Geometry and Spatial Sense** Students will describe the characteristics of two dimensional shapes and the effects of combining them. Students will demonstrate connections between geometry and arithmetic operations. Students will use reasoning in geometry, and recognize similar characteristics of geometric shapes in different settings.

- **Fractions and Decimals** Students will demonstrate the meaning of parts of a fraction. They compare fractions and whole numbers using models.

Brief Overview:

Your school is having a celebration. Students will apply knowledge of geometric figures and fractional parts in assigning sections of a given space for various Oktoberfest activities.

Grade/Level:

Grades 3 and 4

Duration/Length:

This activity will take a total of 4 periods of 35 - 50 minutes each, depending on the ability level of the group. Assessment will take place during the third and fourth lesson periods. *(Variation: space lessons over four consecutive Fridays, developing a month-long theme.)*

Prerequisite Knowledge:

- Students should be able to identify basic geometric shapes: square, rectangle, triangle, circle.
- Students should know the correct format for a friendly letter.

Objectives:

Students will:

- identify, model, and write fractions.
- model, determine, and write equivalent fractions.
- manipulate fractional parts to construct a whole.
- create an original design using fractional parts.
- use data to solve problems.
- write a letter explaining their design and its advantages.

Materials/Resources/Printed Materials:

- Student worksheets
- Crayons for each student
- Scissors for each student
- 8 ½ " x 11" white paper (several sheets per student)
- Glue or tape for each student
- One large manila envelope per student (for holding fraction pieces)
- Chart paper or overhead projector (for recording student responses)

Development/Procedures:

Lesson 1:

- Introduction: As motivation, tell the students they have been chosen to plan an outdoor Oktoberfest celebration for the school. If needed, relate the theme to an appropriate time of the year such as Spring Fest. As a class, brainstorm a list of outdoor sports activities. Allow 3 - 5 minutes for discussion. Record student responses on chart paper or overhead projector. Activity suggestions:

Tug-of- war	*Relay races*
Softball throw	*Standing broad jump*
Running broad jump	*Etc.*

Teacher displays Figure A on Skill sheet #1 using a chart or overhead transparency. Explain to students that the top illustration represents the space allotted for the activities. Begin a discussion with students identifying the geometric shape and its characteristics. Tell the students they will be deciding how to divide the space for the activities.

- Pass out 3 sheets of white paper to each student. Ask students to compare the shape of the paper to the shape in Figure A. Discuss similarities and differences. Explain to students that the paper represents the total field space for the outdoor activities. Ask students how they could divide the field if equal space was needed for two games. Students then fold and tear the paper to demonstrate equal parts (see diagram). Ask for the name for each of the equal parts (one-half, ½). Ask students if paper could be folded any other way to show two equal parts.

- Follow the same procedure with examples for 4 games and 8 games. Students should model and show the class ½, 1/4, and 1/8. Discuss meanings of each fractional part (numerator - what part of the whole, denominator - total number of parts). Example: ½ is one part of 2.

- Guide the students to use their paper fractions to model equivalent fractions. Do several examples. (2/8 = 1/4; ½ = 2/4; 4/8 = ½)

- On chalkboard, draw other geometric shapes (square, circle, triangle). Students should identify shapes by name and characteristics.
  Draw and shade in different fractional parts having students identify appropriate fraction name for shaded or unshaded areas.

- Hand out envelopes so students can save fractional pieces for Lesson 2.

- Hand out Skill sheets 1A and 1B. Refer to Figure A as the total space for the activities. Next, refer to Figure B and discuss in terms of fractional parts.

- As a class, choose 5 activities from the brainstorming chart. Decide how many parts of the field are needed for each activity. (How many eighths?) Remind them that the total MUST equal 8. Teacher should record student responses on the board in a chart form.

- As a class, choose a color for each activity and record choices on the board.

- Next, students need to cut apart the rectangle in Figure B. NOTE - Be sure the students cut out the parts before coloring them.

- Students color the correct number of parts for each activity and manipulate them on Figure A to fill the space. Students should be able to explain and justify their arrangements. Students finish by glueing parts on Figure A and drawing the color key below it.

- End the lesson by discussing the fractional parts used. Include such questions as:

  Name the fraction for the activity using the greatest/least space.
  Is there another name for this same fraction?
  What is the fraction name for the ____ activity?
  Is there another name for this fraction?

  Collect student worksheets to use for review at beginning of Lesson 2.

Lesson 2:

- Return papers and envelopes from Lesson 1 to students. Review.

- Give each student four pieces of paper. As in Lesson One, review ½ and 1/4, but introduce 1/3, 1/6, and 1/12. Inform students that there are other areas that will be needed for the Oktoberfest Celebration. They are:

food table area	picnic area
games area	craft table area

- Distribute Skill sheets # 2 and 3. For Skill sheet 2 ,figure C, students need to decide the color and number of spaces each area needs (note: all 12 spaces must be used). Students should record information on figure C.

- Instruct students to color parts on Skill sheet #3 Figure D using the data from Skill sheet 2 figure C. Remind students to complete the key below figure D.

- Allow time to compare designs. Then discuss why some designs are more appropriate than others.

Evaluation:

Lesson 3:

- Distribute Skill sheets 4A, 4B, and 4C for students to complete independently. Teachers should give assistance with directions as determined by the group.

Lesson 4:

- Distribute Skill sheet 4D, Peer Response Form, and Skill sheet 4E for students to write their final draft of their persuasive letter.

Extension/Follow Up:

- Complete similar tasks using geometric shapes other than rectangles.
- Graph data from charts.
- Add and subtract using fractions.
- Use geo boards to demonstrate fractional parts.
- Calculate area and perimeter of total designs and specific areas.
- Design a floor plan for a building or a house. Determine perimeter, area and fractional parts.

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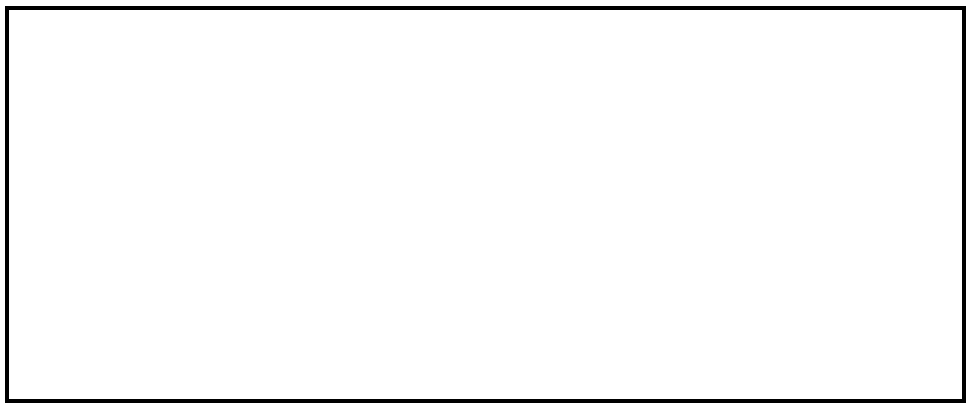
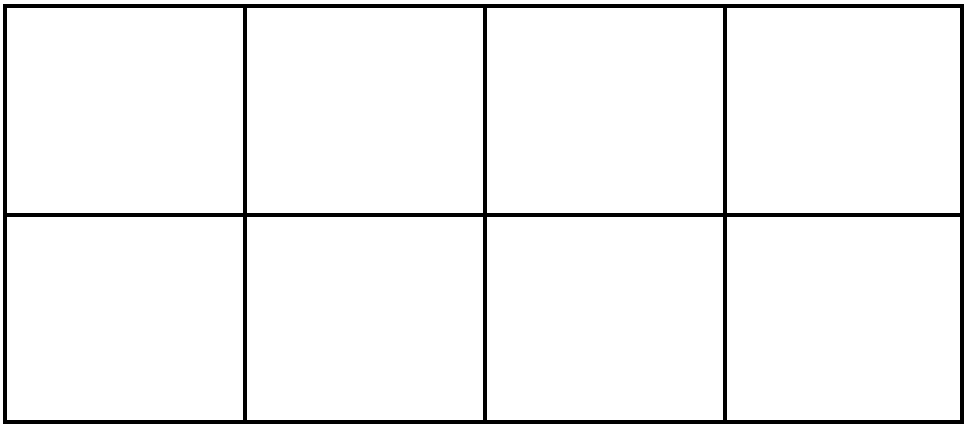
SKILL SHEET 1A

Figure A



SKILL SHEET 1B



SKILL SHEET 2

Complete the chart.

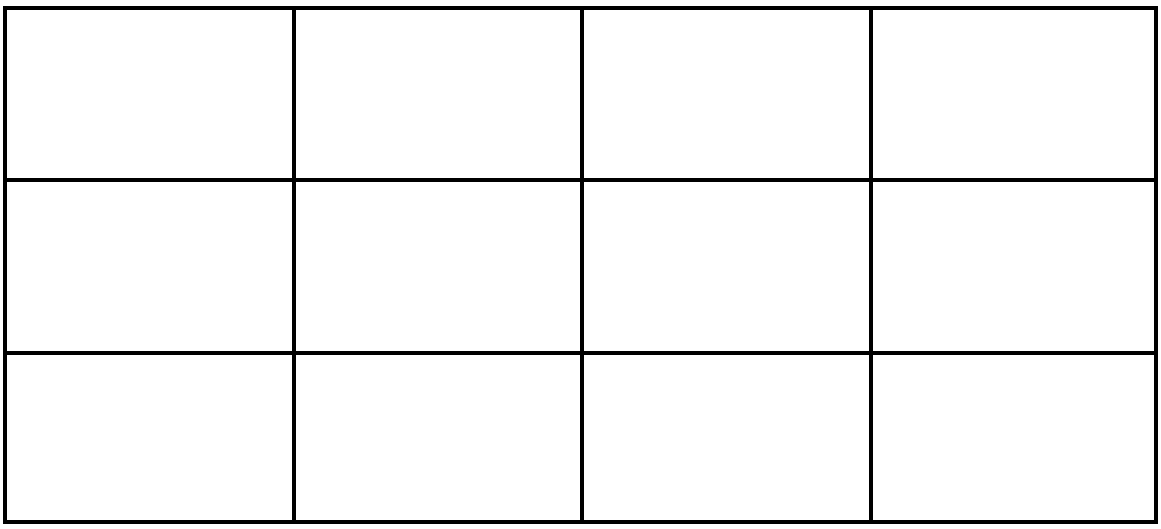
Figure C

Title _____

AREAS	# OF PARTS	COLOR
1. Food table		
2. Picnic		
3. Games		
4. Crafts		

SKILL SHEET 3

Figure D



Key

SKILL SHEET 4A

Recently we have been working on ways to plan an Oktoberfest Celebration at our school. Using what you have learned and the information below, complete the chart.

> The picnic area will use 1/6 of the total space.

> Relay races will use 1/3 of the total space.

> Games will use 1/4 of the total space.

> The jumping competition will use 2/12 of the total space.

> The food tables will use the remaining space.

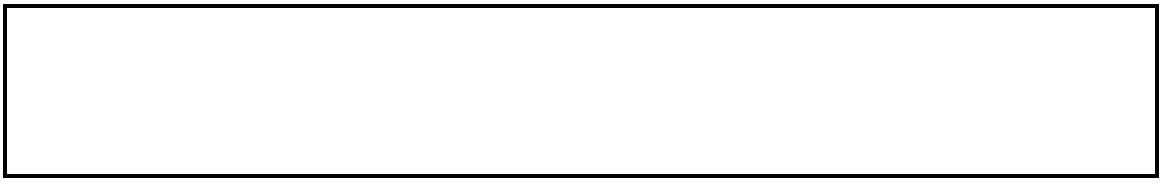
ACTIVITY	NUMBER OF SPACES	COLOR

SKILL SHEET 4B

Use the data from your chart to complete Figure E. Be sure to use all of the spaces.

Figure E

Key



Use the information to answer the following questions.

1. Which two activities use the same amount of space?

   _____

2. Which activity requires the largest space? _____

3. Which activity requires the least amount of space? _____

4. Which activity uses 3/12 of the total space? _____

5. Name two activities which together use ½ of the total space.

   _____

SKILL SHEET 4C

Writing Prompt: you have completed your design for the Oktoberfest Celebration. Write a letter convincing your gym teacher to use your design. BEFORE YOU BEGIN WRITING think about these things:

-- to whom you are writing
--what advantages your placement has regarding the various specified activities.
-- how you will persuade your gym teacher to use your design
--what parts to include when writing a persuasive letter.

SKILL SHEET 4D

On the lines below write a note to your gym teacher explaining your design and its advantages.

SKILL SHEET 4 E

PEER RESPONSE FORM

Read the first draft of your letter to your partner. Ask your partner the following questions. Write yes or no in the spaces provided

1. Did I include the following:

   Date:_____ Greeting: _____ Closing and name: _____

2. Did I include the advantages of my placement for the various activities? _____

3. Did I include reasons which would persuade my gym teacher to use my design?

   _____

Now ask your partner to look at your rough draft.
Ask your partner to answer the following questions by writing yes or no in the spaces provided.

4. Have I used complete sentences? _____

5. Have I capitalized properly? _____

6. Have I spelled words correctly? _____

7. Have I used correct punctuation? _____

8. Does my letter make sense? _____

Now ask your partner to suggest ways that your letter could be improved. List your partner's ideas in the space below.